

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strike through~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1. (currently amended) A picture inputting apparatus comprising:
 - a solid state image pickup device having a high-resolution pixel array consisting of a plurality of photo-receptive elements disposed at a high density for converting a formed image into a pixel value of an electric signal by photoelectric conversion;
 - a low-resolution whole picture scanning unit which outputs low-resolution whole picture data by reading out and scanning the wholeness of an imaging range with the pixel array resolution lowered;
 - a high-resolution partial picture scanning unit which outputs high-resolution partial picture data by partially reading out and scanning the imaging range with the pixel array high-resolution kept;
 - a switching unit which provides a switching between the low-resolution whole picture scanning unit and the high-resolution partial picture scanning unit within a predetermined frame period of picture signals to thereby output in sequence the low-resolution whole picture data and the high-resolution partial image data at a speed equal to or greater than the video rate; and
 - an image processing unit which automatically determines the extracting position of the high-resolution partial picture at the next frame, based on the low-resolution whole picture data output from the low-resolution whole picture scanning unit, to thereby instruct the high-resolution partial picture scanning unit on the extracting position.

2. (original) The picture inputting apparatus according to claim 1, further comprising:
 - a low-resolution whole picture accumulation unit which accumulates the low-resolution whole picture data output as a result of readout scanning of the pixel array;
 - a whole picture data transmission unit which reads out images accumulated in the low-

resolution whole picture accumulation unit to shape the low-resolution whole picture data into a single piece of picture data in a predetermined format, for the output to the outside;

a high-resolution partial picture accumulation unit which accumulates the high-resolution partial picture data output as a result of the readout scanning of the pixel array; and

a partial picture data transmission unit which reads out images accumulated in the high-resolution partial picture accumulation unit to shape the high-resolution partial picture data into a single piece of picture data in a predetermined format, for the output to the outside.

3. (original) The picture inputting apparatus according to claim 1, wherein the solid state image pickup device includes:

a plurality of photo-receptive elements which are two-dimensionally arranged in N1 rows and N2 columns;

a column selection line and a row selection line which select individually the plurality of photo-receptive elements to allow output of a pixel value;

two output lines disposed at each of the plurality of photo-receptive elements; and

a plurality of filters which calculate and output the sum or the mean value by connecting to their respective inputs one output lines of the photo-receptive elements on an n1 rows and n2 columns pixel basis where n1 and n2 are integers obtained by dividing high-resolution N1 rows and N2 columns by low-resolution m1 rows and m2 columns, respectively, where the pixel count of the N1 rows and N2 columns provides a high-resolution picture while the pixel count of m1 rows and m2 columns less than the pixel count of the N1 rows and N2 columns provides a low-resolution picture,

wherein

the low-resolution whole picture scanning unit collectively selects the photo-receptive elements for each n1 rows and n2 columns for each of the plurality of filters and simultaneously allows filter outputs of m1 rows and m2 columns to be output in the form of low-resolution whole picture signals, and wherein

the high-resolution partial picture scanning unit scans the photo-receptive elements in k1 rows and k2 columns which are designated as the extracting position within the N1 rows and N2 columns to allow pixel values to be output as high-resolution partial picture signals from the other output lines.

4. (withdrawn) The picture inputting apparatus according to claim 1, wherein

the solid state image pickup device includes:

a plurality of photo-receptive elements which are two-dimensionally arranged in N1 rows and N2 columns; and

a column selection line and a row selection line which select individually the plurality of photo-receptive elements to allow output of a pixel value, wherein

the low-resolution whole picture scanning unit allows output of low-resolution whole picture signals while thinning out pixel values for each n1 rows and n2 columns where n1 and n2 are integers obtained respectively by dividing high-resolution N1 rows and N2 columns respectively by low-resolution m1 rows and m2 columns, where the pixel count of the N1 rows and N2 columns provides a high-resolution picture while the pixel count of m1 rows and m2 columns less than the pixel count of the N1 rows and N2 columns provides a low-resolution picture, and wherein

the high-resolution partial picture scanning unit scans the photo-receptive elements in k1 rows and k2 columns which are designated as the extracting position within the N1 rows and N2 columns to allow pixel values to be output as high-resolution partial picture signals.

5. (currently amended) The picture inputting apparatus according to claim 3-~~or~~4, wherein

the low-resolution whole picture scanning unit and the high-resolution partial picture scanning unit perform readout scanning such that the low-resolution whole picture and the high-resolution partial picture have the same pixel size.

6. (currently amended) The picture inputting apparatus according to claim 3-~~or~~4, wherein

the low-resolution whole picture scanning unit and the high-resolution partial picture scanning unit perform readout scanning such that the low-resolution whole picture and the high-resolution partial picture have the same pixel size which is expressed by a matrix of 512×480 pixels in NTSC, 768×576 pixels in PAL or 640×480 pixels in VGA.

7. (currently amended) The A picture inputting apparatus comprising:

a solid state image pickup device having a high-resolution pixel array consisting of a plurality of photo-receptive elements disposed at a high density for converting a formed image into a pixel value of an electric signal by photoelectric conversion;

a low-resolution whole picture scanning unit which outputs low-resolution whole picture data by reading out and scanning the wholeness of an imaging range with the pixel array resolution lowered;

a high-resolution partial picture scanning unit which outputs high-resolution partial picture data by partially reading out and scanning the imaging range with the pixel array high-resolution kept;

a switching unit which provides a switching between the low-resolution whole picture scanning unit and the high-resolution partial picture scanning unit within a predetermined frame period to thereby output in sequence the low-resolution whole picture data and the high-resolution partial image data at a speed equal to or greater than the video rate; and

an image processing unit which automatically determines the extracting position of the high-resolution partial picture at the next frame, based on the low-resolution whole picture data output from the low-resolution whole picture scanning unit, to thereby instruct the high-resolution partial picture scanning unit on the extracting position according to claim 4, wherein

the image processing unit includes:

an object region extraction unit which extracts a changed object region and an unchanged non-object region based on the difference of pixels between low-resolution whole picture data of the current frame and background picture data of the last frame;

a background picture updating unit which adds the unchanged non-object region to the background picture data, for updating;

a noted position detection unit which selects an undetected noted object through the comparison of the object region data with detected object data of the last frame, to determine a noted position, the noted position detection unit adding the selected noted object to the detected object data, for updating; and

an extracting position determination unit which predicts a noted position of the next frame based on a motion model obtained from the frame history of the noted position of the selected noted object, to determine a picture extracting position of the next frame.

8. (original) The picture inputting apparatus according to claim 1, wherein

the image processing unit automatically determines the extracting position of a high-resolution picture at the next frame based on the high-resolution partial picture data in addition to the low-resolution whole picture data and instructs the high-resolution partial picture scanning unit on the determined extracting position.

9. (currently amended) ~~The A picture inputting apparatus comprising:~~
a solid state image pickup device having a high-resolution pixel array consisting of a plurality of photo-receptive elements disposed at a high density for converting a formed image into a pixel value of an electric signal by photoelectric conversion;
a low-resolution whole picture scanning unit which outputs low-resolution whole picture data by reading out and scanning the wholeness of an imaging range with the pixel array resolution lowered;
a high-resolution partial picture scanning unit which outputs high-resolution partial picture data by partially reading out and scanning the imaging range with the pixel array high-resolution kept;
a switching unit which provides a switching between the low-resolution whole picture scanning unit and the high-resolution partial picture scanning unit within a predetermined frame period to thereby output in sequence the low-resolution whole picture data and the high-resolution partial image data at a speed equal to or greater than the video rate; and
an image processing unit which automatically determines the extracting position of the high-resolution partial picture at the next frame, based on the low-resolution whole picture data output from the low-resolution whole picture scanning unit, to thereby instruct the high-resolution partial picture scanning unit on the extracting position according to claim 6, wherein
the solid state image pickup device includes:
a plurality of photo-receptive elements which are two-dimensionally arranged in N1 rows and N2 columns;
a column selection line and a row selection line which select individually the plurality of photo-receptive elements to allow output of a pixel value;
two output lines disposed at each of the plurality of photo-receptive elements; and
a plurality of filters which calculate and output the sum or the mean value by connecting to their respective inputs one output lines of the photo-receptive elements on an n1 rows and n2 columns pixel basis where n1 and n2 are integers obtained by dividing high-resolution N1 rows and N2 columns by low-resolution m1 rows and m2 columns, respectively, where the pixel count of the N1 rows and N2 columns provides a high-resolution picture while the pixel count of m1 rows and m2 columns less than the pixel count of the N1 rows and N2 columns provides a low-resolution picture, wherein
the low-resolution whole picture scanning unit collectively selects the photo-receptive

elements for each n1 rows and n2 columns for each of the plurality of filters and simultaneously allows filter outputs of m1 rows and m2 columns to be output in the form of low-resolution whole picture signals, and wherein

the high-resolution partial picture scanning unit scans the photo-receptive elements in k1 rows and k2 columns which are designated as the extracting position within the N1 rows and N2 columns to allow pixel values to be output as high-resolution partial picture signals from the other output lines, wherein

the low-resolution whole picture scanning unit and the high-resolution partial picture scanning unit perform readout scanning such that the low-resolution whole picture and the high-resolution partial picture have the same pixel size which is expressed by a matrix of 512×480 pixels in NTSC, 768×576 pixels in PAL or 640×480 pixels in VGA, wherein

the image processing unit includes:

an object region extraction unit which extracts a changed object region and an unchanged non-object region based on the difference of pixels between low-resolution whole picture data of the current frame and background picture data of the last frame;

a background picture updating unit which adds the unchanged non-object region to the background picture data, for updating;

a prediction failure detection unit which compares high-resolution partial picture data acquired at the current frame with low-resolution whole picture data at the extracting position accumulated in the last frame, the prediction failure detection unit if the two pictures differs from each other, removing the noted object from the detected object picture of the last frame;

a noted position detection unit which selects an undetected noted object through the comparison of the object region data with the detected object picture data, to determine a noted position, the noted position detection unit adding the selected object to the detected object picture data, for updating; and

an extracting position determination unit which predicts a noted position of the next frame based on a motion model obtained from the frame history of the selected noted object, to determine the extracting position of the next frame.

10. (original) The picture inputting apparatus according to claim 1, wherein the image processing unit determines the extracting position of a high-resolution partial picture based on the execution of an image processing program externally loaded and retained or on an external instruction.

11. (original) The picture inputting apparatus according to claim 1, further comprising:

a picture transmission unit which converts into analog picture signals low-resolution whole picture data output from the low-resolution whole picture scanning unit and high-resolution partial picture data output from the high-resolution partial picture scanning unit, to transmit the obtained analog picture signals to an external image processor via a transmission path.

12. (original) The picture inputting apparatus according to claim 11, wherein the picture transmission unit converts the low-resolution whole picture data and the high-resolution partial picture data into analog picture signals, respectively, for parallel transmission.